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09/531,163	03/17/2000	Hiroyuki Yano	0039-7632-0X	5064

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EXAMINER

DEO, DUY VU NGUYEN

ART UNIT PAPER NUMBER

1765

DATE MAILED: 10/02/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/531,163

Applicant(s)

YANO ET AL.4

Examiner

DuyVu n Deo

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 30 July 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 81-100 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 100 is/are allowed.
- 6) ☒ Claim(s) 81-98 is/are rejected.
- 7) ☒ Claim(s) 99 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 81, 84-90, 94-98, are rejected under 35 U.S.C. 103(a) as being unpatentable over Ronay (5,876,490).

Ronay teaches an slurry that is used for CMP containing polymer particles, inorganic particle, and water, wherein the polymer particles has charge different from the charge associated with the inorganic particle so that the polymer particles are highly attracted to the surface of the abrasive particles to form polymer-coated inorganic particles (claims a plurality of inorganic particles are attached to a surface of polymer particles (col. 3, line 40-43; col. 4, line 55-65). This would reads on claimed zeta potential of polymer particles are opposite as that of the inorganic and they are electrostatically bonded to form composite particles. Unlike claimed invention, Ronay doesn't describe the ratio of the mean particle size of the polymer and the abrasive particles is 1-40 or from 1.5-20. As described by Ronay, the polymer size is suggested to be in submicron particles (col. 7, line 65), which can be from 0.001-0.999 um and the abrasive particles are preferably at 0.075-0.1 um (col. 7, line 45). These ranges would includes the ratio within claimed ratio of 1-40 because submicron polymers at 0.999 um and abrasive particles at 0.1 would have a ratio of 9.99, which should be within claimed ratio of 1-40. Furthermore, the

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slurry would contain thousands of abrasive, particles which can be much smaller size than the polymers, and the amount of polymers are much smaller than the abrasive particles, 20 %wt of the abrasive particles in the slurry (col. 5, line 22), therefore in the slurry, a surface of the polymer would attached several abrasive particles.

The polymer particles have acidic groups poly(acrylic acid) (claimed carboxyl group and the anion) for the alumina abrasive or basic groups such as polymers with amino, amide, imide (claimed cation-formable nitrogen containing group and their cation) to coat silica particles. (col. 5, line 25-50). The slurry typically contain acidic oxidant (oxidizing agent) and further contains a dual-valent rare earth or suspension of its colloidal hydroxide, wherein the rare earth ion is in its higher valent form such as  $Ce^{4+}$ ,  $Pr^{4+}$  and  $Tb^{4+}$  (claimed polyvalent metal ion) (col. 7, line 5-40; col 65-col. 8, line 24).

In col. 5, lines 21-22, Ronay also teaches the ratio, of the content of the polymer particles to the abrasive particles, that would overlap claimed of 0.05-1 (col. 5, line 21-22). Therefore, it would have been obvious at the time of the invention for one skill in the art to determine the amount of the polymers and the particles through routine experimentation in order to form a composite of particles and polymer particles to polish wafer with an anticipation of an expected result. The slurry further comprises a surfactant, which is typically about 0.1-2 w% (col. 8, line 6-21).

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3. Claims 82, 83, 91-93 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ronay as applied to claims 81, 90 above, and further in view of Hosali et al (US 5,738,800) and Skrovan et al. (US 5,916,819).

Referring to the pH of the slurry, Ronay describes the pH for oxide polishing is in the alkaline pH regime (col. 6, line 32-33). Skrovan teaches that pH of the slurry would be depending on the type of the surface being polished such as oxide polishing having pH greater than 9 and metal polishing having pH of about 4 (col. 5, line 20-25). Furthermore, Hosali shows in col. 3, line 1-35 that the pH of the slurry is to be determined through test run. Therefore, it would have been obvious at the time of the invention for one skill in the art to determine the pH of the slurry through routine experimentation depending on the material being polished.

#### *Allowable Subject Matter*

4. Claim 100 is allowed because Ronay doesn't suggest the mean particle size of composite particles, including a plurality of inorganic particles are attached to a surface of each of polymer particles, is not greater than 1um.

Claim 99 is allowable with the same above reason.

#### *Claim Objections*

5. Claim 99 is objected to because of the following informalities: the limitation of "a mean particle size of said composite particles is not greater than 1 m" will be understood as 1 um since claim 99 corresponds to cancelled claimed 79 as according to the applicant's response.

Appropriate correction is required.

*Response to Arguments*

6. Applicant's arguments and Declaration filed 3/14/03 have been fully considered but they are not persuasive.

Ronay's description that Ronay describes that polyelectrolytes are usually soluble in water is acknowledged. As described by Ronay, it is not necessary always to be soluble in water. Furthermore, since the polyelectrolytes are attached to the abrasive particles that are not soluble in water, the polyelectrolytes are not soluble in water. This would form a dispersion of claimed polymer particles, abrasive particles, and water. Also the polyelectrolytes have claimed functional group such as carboxyl or sulfonic acid group (col. 5, line 25-36).

Referring to applicant's argument that water soluble polyelectrolytes cannot render obvious a polymer particle containing functional group, please see col. 5, line 25, 26 where he describes the groups by which the polyions can be bound to the abrasive particles contains claimed functional groups.

Referring to applicant's argument that Ronay doesn't describe a plurality of inorganic particles is attached to the surface of each polymer particles is acknowledged. However, the slurry would contain thousands of abrasive, particles which can be much smaller size than the polymers, and the amount of polymers are much smaller than the abrasive particles, 20 %wt of the abrasive particles in the slurry (col. 5, line 22), therefore in the slurry, a surface of the polymer would attached several abrasive particles.

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The applicant's argument about the better results and Declaration filed 4/4/03 have been considered and found not persuasive because the result in the Declaration contains a comparing for one only date point, and it does not show how the result is commensurate in scope with the claims. Whether the unexpected results are the result of unexpectedly improved results or a property not taught by the prior art, the "objective evidence of nonobviousness must be commensurate in scope with the claims which the evidence is offered to support." In other words, the showing of unexpected results must be reviewed to see if the results occur over the entire claimed range. In re Clemens, 622 F.2d 1029, 1036, 206 USPQ 289, 296 (CCPA 1980). This one point result also does not provide unexpected result of claimed range Sp/Si from 1-40. Furthermore, it is unclear where in Ronay discloses "Ronay's slurry", including composition concentration, which is prepared by the applicant in the Declaration. It doesn't show the slurry's pH.

### ***Conclusion***

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

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however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DuyVu n Deo whose telephone number is 703-305-0515.

DVD

September 30, 2003

NADINE G. NORTON  
PRIMARY EXAMINER

A handwritten signature in black ink, appearing to read 'Norton', written in a cursive style.